DOCUMENT RESUME

ED 191 744 SE 032 879

TITLE	Managing Your Home's Energy Dollar: An Energy Management Workbook for the Homeowner.
INSTITUTION	Energy Information Associates, Inc., Littleton, Colo.
SPONS AGENCY	Arapahoe County School District 6, Littleton, Colo.
PUB DATE	Aug 80
NOTE	42p.
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*Building Design; *Decision Making; *Energy; *Energy Conservation; *Fuel Consumption; Fuels; *Home Economics; Information Dissemination; Nonformal Education; Science Education; Technical Education
IDENTIFIERS	*Energy Education

ABSTRACT

This workbook is intended to teach the homeowner some actions to be taken in the home to conserve energy and reduce energy-related costs. The workbook is arranged around five steps: (1) read utility meters, (2) study utility bills, (3) "tune-up" home energy systems, (4) make informed decisions about energy conservation products, and (5) compare sequential energy bills to keep track of energy conservation progress. (RE)

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Managing Your Home's Energy Dollar

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An Energy Management Workbook for the Home Owner

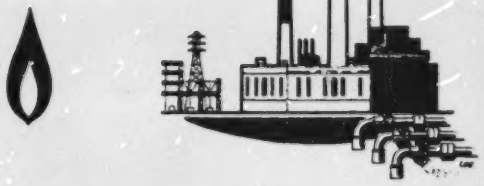
SE 032 879

INTRODUCTION

Your energy bills are probably higher now than they've ever been. But utility bills, in general, are still rising - with no end in sight! What can you DO rather than just watch energy costs continue to cut into your household budget?

There are many simple ways to reduce the amounts you would otherwise have to pay for energy. This workbook will help you examine the ways in which your house consumes energy needlessly - energy which you must pay for - and it will show you how YOU can make your home more energy efficient using practical energy conservation techniques that work!

By taking the actions indicated in this workbook, you are on the way to major energy and dollar savings - while doing your share to decrease our dependence on foreign sources of energy.



MANAGING YOUR HOME'S ENERGY DOLLAR

An Energy Management Workbook For The Homeowner

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August, 1980

THE TYPICAL COLORADO HOME ENERGY DOLLAR

HERE'S WHERE IT GOES:

1.	Home Heating/Cooling	66¢
2.	Appliances/Lighting	20¢
3.	Hot Water	14¢
		100¢

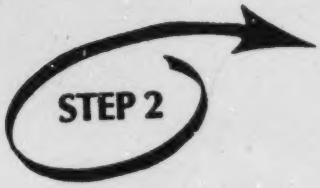
With inflation driving up the prices of other goods and services, you are wise to expect to pay more dollars for the same amount of energy in the future!

However, in most cases, large savings can be made once people become aware of the problems and some low-cost ways of solving them. Whether you own your home, rent a house, live in an apartment or mobile home, the simple and practical plan of energy management presented in this workbook will help right away.

YOUR ENERGY MANAGEMENT PLAN

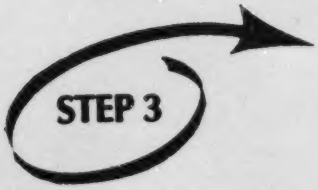
READ YOUR OWN GAS AND ELECTRICITY METERS EACH MONTH.

This is a simple procedure and will uncover possible errors in your bills.



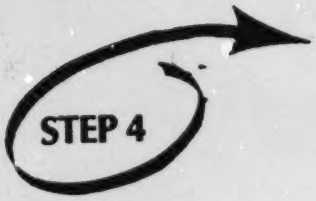
KEEP TRACK OF HOW MUCH ENERGY YOU USE EACH MONTH BY CAREFULLY READING YOUR BILL AND FILLING OUT THE ENERGY FORMS PROVIDED.

You will be able to plan ahead, thus avoiding unnecessary "surprises" in your budget.



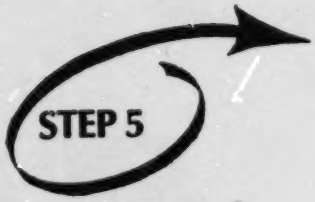
FOLLOW THE EASY SUGGESTIONS TO HELP YOU MAKE YOUR HOME MORE ENERGY EFFICIENT.

Those listed are really just common sense - and they work!



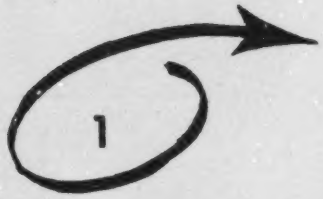
WHEN MAKING DECISIONS ABOUT CONSERVATION PRODUCTS, CHECK THIS GUIDE TO GET THE MOST VALUE FOR YOUR DOLLAR.

Learn what to look for when buying a new energy conservation product. Be sure to get the right product for your home.

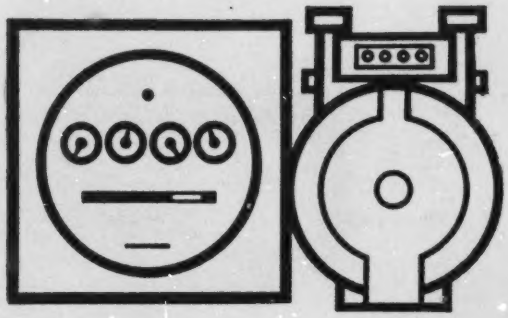


COMPARE YOUR ENERGY USE BY MONTH TO SEE HOW WELL YOU ARE DOING.

By comparing last year's energy use to this year's you can tell how much energy (and money) you are saving.



HOW TO READ YOUR METERS



LEARN HOW TO READ

. YOUR GAS METER

. YOUR ELECTRIC METER

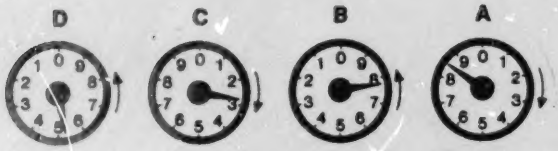
IT'S EASY AND IT MAY SAVE YOU MONEY!

7

HOW TO READ YOUR GAS METER

(From Right To Left)

The main thing to remember when reading your gas meter is that until the dial pointer has passed a number, it is always read as the smaller number. For example, in Dial A the pointer is between the numbers 8 and 9. Therefore, the reading on that dial is 8.



5 2 7 8

A gas meter consists of 4 dials the dial on the far right (A) registers HUNDREDS OF CUBIC FEET, Dial B registers thousands of cubic feet, Dial C registers tens of thousands of cubic feet and Dial D registers hundreds of thousands of cubic feet.

We have already determined that the reading on Dial A is 8. Dial B is almost at 8 but has not yet passed it so the reading on this dial is 7. Dial C's pointer has not yet passed 3 so the reading here is 2, while Dial D is 5. The reading on this meter is then written as 5278.

Suppose that the reading on your last month's bill was 4951. By subtracting 4951 from 5278 you get 327 HUNDREDS OF CUBIC FEET. TO GET THE TRUE READING IN CUBIC FEET YOU MUST ADD TWO ZEROS TO THIS NUMBER. The meter tells you, therefore, that you have used 32,700 cubic feet of natural gas since the last time you checked it.

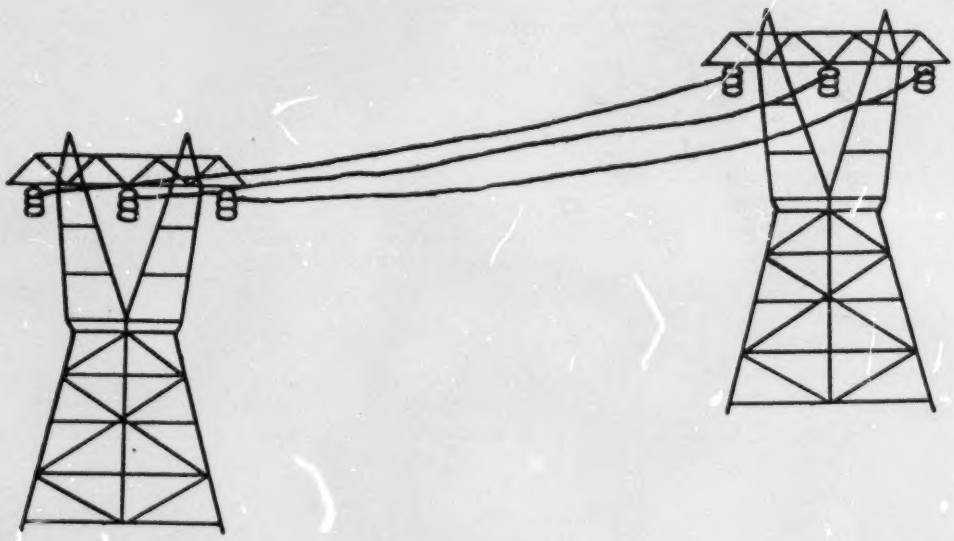
HOW TO READ YOUR ELECTRIC METER

(From Right To Left)

Reading an electric meter is much the same as reading a gas meter, except you are determining KILOWATT-HOURS. However, the reading represents the actual number of kilowatt-hours consumed. There is NO NEED to add the two zeros to your total.

9 4 8 4

Using the illustration above and reading the dials as before, you should read 9484 kilowatt-hours. Suppose your last month's reading was 8750. Subtracting one from the other, you find that you have used 734 kilowatt-hours in that period of time.



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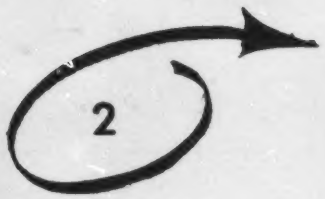
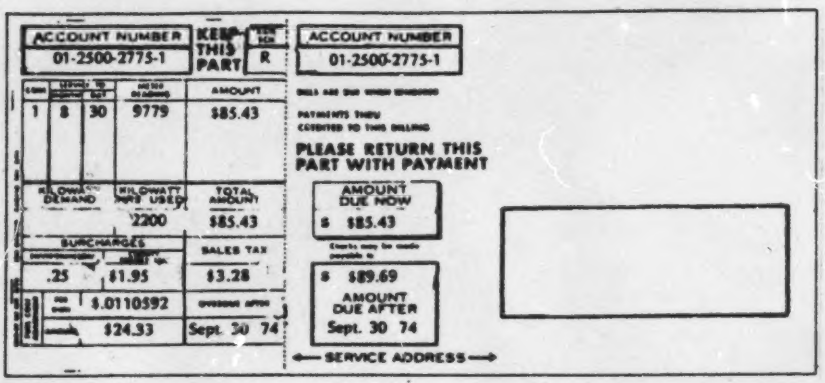


KEEPING TRACK OF HOW MUCH YOU USE

LEARN HOW TO READ YOUR UTILITY BILL.

THEN, PLACE THE INFORMATION ON THE SPECIAL FORMS AND USE THEM TO PLAN AHEAD.



UNDERSTANDING MORE ABOUT YOUR BILL

Here is a typical utility bill. Your bill may not look exactly like this one. However, most of the information will probably appear on your bill. Important parts of this sample bill are marked with numbers inside circles. These are explained on the next two pages.

YOUR UTILITY COMPANY OF COLORADO

Date Billed	Date Due
JAN 14 80	JAN 26 80

05 048 11

BILL PAYER
5020 MAIN

(1) Your Account Number: 6 0110 542 453 000 1 5

Budget Billing Information

Previous Budget Balance	
Current Energy Charges +	
Present Budget Balance =	
Monthly Budget Payment -	(2)
Balance After Payment =	

(3) Description of Energy Used

	Type Service	Dates Service From	To	Days	Bill Code	Prev. Reading	Present Reading	Const.	(7) Usage	Unit of Meas	Billing Demand
1	Gas	Dec 07	Jan 08	32	N	9131	9444	(6)	313	CCF	(8)
2	Elec	Dec 07	Jan 08	32	N	99	041		1045	KWH	
3											
4											

(4) (5)

Current Energy Charges

	(9) Rate	Base Amount	GCA/FCA +Amount		Franchise + Tax	+Sales Tax Percent	+Sales Tax Amount	Current Charges
1	RG-1	31 32	40	80		3.5	2 52	74 84
2	R-1	41 75	5	65		3.5	1 66	49 06
3								
4								

(10) (11) (12)

Sales Tax - State 3.0% RTD 0.5%

Current Other Charges

Description	Date First Billed	Order Number	Annual Int. Rate	Contract Amount	Balance	Monthly Payment

(13) Prev. Bill 111.30 Less 1 Pmt. Totaling 111.30=Previous Billing 00

GCA Amount = 3.3 CCF X.130340 = 40.80
FCA Amount = 1053 KWH X.005370 = 5.65

(15) GCA Refund - 10 19 (14)
Current Energy Charges 123 70
Current Other Charges (16)

Total Present Balance (17) 113 51 (18)

(19) Average Daily Cost Gas = $2.33 Electricity = $1.53

AMOUNT DUE

The numbers in the following list explain parts of the bill on the opposite page:

1. Your Account Number: Use this number when talking to the utility company about your bill.

2. Budget Billing: If you are on this special system of billing, this section explains your charges.

3. Service: Tells what kind of energy was sold to you and the time period.

4. Code: Tells whether your meter was read or was estimated.

5. Meter Readings: Shows how many hundreds of cubic feet of gas and how many kilowatt-hours of electricity were registered on your meters.

6. Meter Constant: This number is stamped on the face of your meter or, if no number is visible, it is automatically a "1". If this number is greater than "1", you must multiply the difference between previous and present meter readings by that number.

7. Your Usage: The difference between your two meter readings multiplied by your meter constant gives total gas (in hundreds of cubic feet) and total electricity (in kilowatt-hours) you used during the service period.

8. Billing Demand: Tells the amount of power in kilowatts for which you will be billed. (Only applicable for all-electric homes).

9. Rate: Tells which price schedule was used to compute your bill.

10. Base: Your energy charges before taxes or any other charges are added in.

11. GCA/FCA: The GCA is the Gas Cost Adjustment and tells your share of extra costs (or refunds) due to changes in wholesale gas prices. FCA is the Fuel Cost Adjustment and shows your share of changes in the cost of the fuel used to make electricity. Your shares of additional costs or refunds are figured at the bottom of the bill.

12. Current Charges: These are figured by adding the base amount + the cost adjustment + taxes.

13. Previous Balance: The amount owed, if any, from previous month.

14. Adjustment: Shows any bill corrections, adjustments or refunds.

15. Current Energy Charge: Total of all energy charges in "Current Charges" column.

16. Current Other Charges: Total of other charges, if any, in the "Monthly Payment" column.

17. Present Balance: The sum of previous balance, any adjustments, current energy and other charges.

18. Amount Due: What you need to pay on or before the Due Date at top left.

19. Average Costs: Tells your average daily costs for energy fuels.

13

USING THE ENERGY FORMS

The forms on the following pages will help you manage your energy and your budget. A form is provided for each of the following energy fuels:

- Natural Gas
- Electricity
- Heating Oil or Propane

Fill out only the forms which apply to the fuels you use in your home.

HOW TO FILL OUT THE ENERGY FORMS

You will need to use the information printed on each month's utility bill.

First, write down the dates of service from your bill in the "Dates Service" column. For example: From January 6 to February 7.

FOR NATURAL GAS AND ELECTRICITY FORMS:

1. Read your meters on the same day as the meter reader, if possible. Write the current reading in Column A and the previous reading in Column B. (Get the previous reading from your last bill.)

2. Subtract the Column B reading from the Column A reading. This is how many hundreds of cubic feet of gas or how many kilowatt hours of electricity you have used this billing period. Write this number in Column C.

3. From your bill write the total energy usage in Column D. This number should be very close to the number in Column C. If it isn't, check for errors.

4. From your bill write the total energy cost in Column E. Exclude taxes but include cost adjustments.

5. At the end of the year write the total usage and cost at the bottom of the forms.

FOR HEATING OIL OR PROPANE FORM:

1. Write the number of gallons delivered in Column A and the dates of delivery.

2. In Column B write the total cost of fuel excluding taxes.

3. Figure the total gallons of heating oil or propane used and the total cost at the end of the year. Write these numbers at the bottom of the form.

ENERGY FORM FOR NATURAL GAS

YEAR 19___

	A		B		C	D	E
	SERVICE DATES FROM	TO	YOUR GAS METER READING NOW	LAST TIME	GAS USAGE	GAS USAGE FROM BILL	TOTAL GAS COST
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
				TOTALS			$

ENERGY FORM FOR ELECTRICITY

YEAR 19___

	A		B		C	D	E
	SERVICE DATES FROM	TO	YOUR ELECTRIC METER READING NOW	LAST TIME	ELECTRIC USAGE	ELECTRIC USAGE FROM BILL	TOTAL ELECTRIC COST
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
				TOTALS			$

ENERGY FORM FOR HEATING OIL OR PROPANE

YEAR 19___

	SERVICE DATES FROM	TO	A NUMBER OF GALLONS	B TOTAL COST
1				
2				
3				
4				
5				
6				
7				
8				
	TOTALS			$

TUNING UP YOUR HOME'S ENERGY SYSTEMS

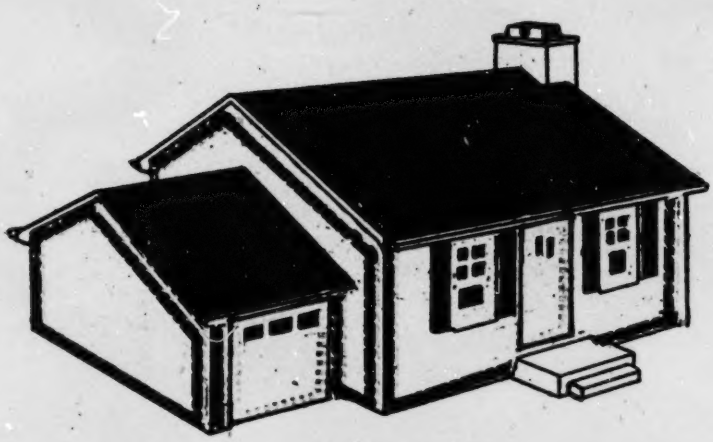
SECTION 1: THE STRUCTURE

SECTION 2: THE HEATING/COOLING SYSTEMS

SECTION 3: HOT WATER

SECTION 4: THE LIGHTING SYSTEM

SECTION 5: YOUR APPLIANCES



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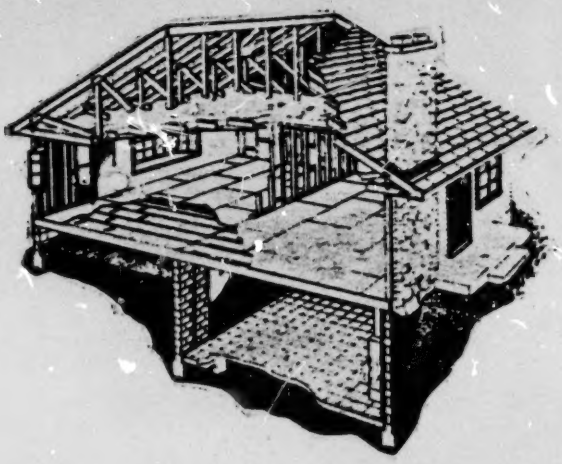

SECTION 1. THE STRUCTURE

Your first step is to make sure that the heated air (or cooled air) stays inside your house. You would be amazed at what causes all those drafts and how little effort is needed to stop the leaks!

✓ Stop heat loss from these worst offenders:

- Bottom edge of drywall
- Badly fitting windows, including sills
- Holes around pipes, inside and outside walls
- Switches and plugs, especially on exterior walls
- Outside door fit
- Access cover to attic space
- Basement door fit
- Garage door fit
- Clothes dryer vent
- Garage-house connection (where they join)
- Fireplace damper
- Heating ducts
- Kitchen exhaust fan vent
- Kitchen cabinets, behind or on top
- Wood paneling on studs or furring
- Basement floor drain
- Toilet paper holder, if on outside wall
- Telephone cord entrance hole
- Abandoned furnace or stove flue
- Bathroom cabinets, behind
- Door latch
- Sky-light
- Ceiling beams penetrating outside walls
- Crawl space opening
- Baseboard heater penetrations

✓ Install insulation over a plastic vapor barrier between the floor joists of your floors. Tape the places where you stapled the plastic to prevent tearing.

- ✓ Cover unfinished concrete basement walls with styrofoam or insulation batts after constructing studs to hold the insulation. Cover the insulation with plastic and tape the staple holes.
- ✓ Clean your fireplace or woodstove chimney regularly.
- ✓ Seal unused windows, and all windows on north side of house, with clear plastic.
- ✓ Plant windbreaks on the north and west sides of your home.
- ✓ Insulate all storage areas and keep temperature setting in those areas between 50-60°F.
- ✓ Insulate behind thermostats to protect from drafts that come through the walls.
- ✓ Construct a second entry way around the primary entrance to your home.
- ✓ Install home-made storm doors and storm windows. Temporary "storm" doors and windows can be made from plastic film six to ten mils thick. (It has been shown that purchase of commercial models is not cost-effective.)
- ✓ Weatherstrip along the bottoms of entry doors.
- ✓ Insulate ducts and hot water pipes.
- ✓ Check insulation around pipes or flues which pass through the attic to the outside.
- ✓ Insulate or increase the amount of fire-proof insulation in your attic floor or top floor ceiling. (Don't insulate over eave vents or on top of recessed lighting fixtures or other heat-producing equipment on the attic floor.)
- ✓ Insulate floors over unheated spaces.
- ✓ Prevent wind from blowing under your house or trailer by building wooden "skirts" or "banking" with dirt.

*

Note: Some insulating materials can be found around the home, especially for filling holes and cracks in walls and around windows and doors. For example, cloth, felt strips, "oakum" and plastic materials can be used.

SECTION 2. THE HEATING/COOLING SYSTEMS

Your heating system takes the lion's share of your energy dollar. It also offers you an opportunity for greater dollar savings.

When the heat is on.....

- ✓ Close off unused, or seldom used, areas of the house and reduce the heat in those rooms.
- ✓ Gather in the same room at night to work, watch TV and do homework.
- ✓ Use kitchen, bath, and other ventilating fans only as needed.
- ✓ Keep your fireplace damper closed unless you are using it.
- ✓ Consider the advantages of a clock thermostat for your heating system.
- ✓ Consider buying a properly sized furnace that has an automatic flue gas damper and/or an automatic pilot (electronic ignition) if a new furnace is needed.
- ✓ Insulate heating ducts in unheated areas.
- ✓ Lower your thermostat setting during the day and at night.
- ✓ Keep windows near your thermostat tightly closed. (Thermostat should not be located on cold outside walls. Have it moved, if necessary.)
- ✓ Have your oil furnace serviced at least once a year.
- ✓ Clean or replace the filter in your forced-air heating system often.
- ✓ Check the duct work for air leaks about once a year if you have a forced-air heating system.
- ✓ Dust or vacuum radiator surfaces frequently.
- ✓ Keep draperies and shades open in sunny windows; close them at night.
- ✓ For comfort in cooler indoor temperatures, use the best insulation of all - warm clothing.

If you use your fireplace when the furnace is on:

- ✓ Lower the thermostat setting to between 50°F and 55°F.
- ✓ Close all doors and warm air ducts entering the room with the fireplace and open a window near the fireplace about 1/2 to 1 inch.
- ✓ Consider installing a glass front or a glass screen if you have a simple open masonry fireplace.

When the cooler is on.....

- ✓ Don't set your thermostat at a colder setting than normal when you first turn your air-conditioner on. (It will NOT cool faster. It WILL cool to a lower temperature than you need and use more energy.)
- ✓ Turn off your window air-conditioners when you leave a room for several hours.
- ✓ Consider using a fan with your window air-conditioner to spread the cooled air farther without greatly increasing your power use.
- ✓ Do your cooking and use other heat-generating appliances in the early morning and late evening hours whenever possible.
- ✓ Use an electric fan next to an open window instead of using your air-conditioner on cooler days and during cooling hours. (Electric fans use relatively little energy.)
- ✓ Be sure to keep windows and outside doors closed during the hottest hours of the day.
- ✓ Use window or whole-house ventilating fans to cool the house when it's cool outside.
- ✓ Use vents and exhaust fans to pull heat and moisture from the attic, kitchen, and laundry directly to the outside.
- ✓ If you need a cooling unit select one with the lowest capacity and highest efficiency.

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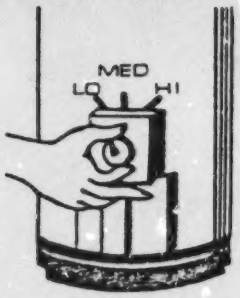

SECTION 3. HOT WATER

The water heater is a large consumer of energy. Most heaters come from the factory set too high -- and this can cost you money unless you reset it. And, there are other ways to save, too.

- ✓ Lower the water heater thermostat setting to 110°F or set control to "low" or "medium".
- ✓ If your water heater is in an unheated area of your home, purchase an insulation blanket made for water heaters and insulate it yourself.
- ✓ To keep your water heater working properly, drain and discard a gallon of water from the bottom of tank once or twice each year. (Use the drain faucet located near the bottom of the tank.)
- ✓ Install flow reducers in all showerheads and faucets which cut flow from five or six gallons a minute to three gallons a minute. (This is more than enough.)
- ✓ Repair leaky faucets promptly.
- ✓ Do as much household cleaning as possible with cold water. Many new detergents are made for cold water use.
- ✓ Insulate your hot water pipes.
- ✓ Use cold water rather than hot water when operating your food disposal unit. (Cold water helps get rid of grease.)
- ✓ Take showers instead of baths. (They use less water.)
- ✓ Be sure to buy an energy efficient water heater if you need a new one.

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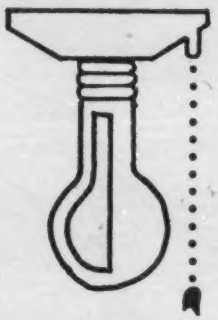

SECTION 4. THE LIGHTING SYSTEM

Excessive use of lighting increases your electric bill. Therefore, the less you use, the lower your bill.

- ✓ Use fluorescent tubes wherever you can; they last longer and give out more light.
- ✓ Consider using fluorescent tubes over the kitchen sink, countertop, garages and basements.
- ✓ Use one large bulb instead of several small ones in areas where bright light is needed.
- ✓ Use long-life incandescent bulbs only in hard-to-reach places.
- ✓ Always turn three-way bulbs down to the lowest lighting level when watching television.
- ✓ Use low-wattage night-light bulbs.
- ✓ Use 50-watt reflector floodlights in spot lights.
- ✓ Keep all lamps and lighting fixtures clean.
- ✓ Use outdoor lights only when they are needed.
- ✓ When you are away, use a timer to turn lights on and off--don't let lights burn the entire time you are away.
- ✓ Use natural light instead of turning on lights whenever possible. Keep the windows clean, and keep drapes and blinds open.
- ✓ Use light paint to help reflect the available light, especially on the ceiling.

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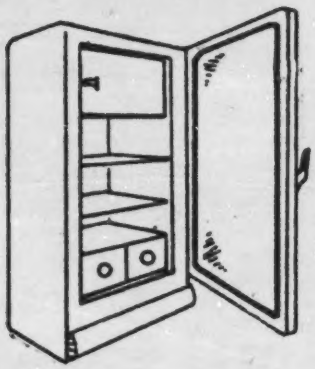

SECTION 5. APPLIANCES

Each appliance may use a few cent's worth of electricity. But over the month the total usage adds up to many dollars.

✓ Don't leave any appliance running when it is not in use.

✓ Keep appliances in good working order.

✓ Before buying new appliances with special features, find out how much energy they use compared with other models.

✓ Do not pre-heat appliances such as stoves, frypans and irons any longer than necessary. These are big energy-users.

✓ Use appliances such as washing machines, dryers and dishwashers only when they have a full load. (These appliances use the same amount of energy each time they are used, and doing many small loads instead of a few big ones wastes energy - and your money.)

✓ Always keep filters, vents and coils on any kind of appliance clean.

✓ When selecting temperatures or cycles with appliances like washers, dryers and dishwashers, don't select settings that are warmer or longer than necessary to do the job at hand.

✓ Proper defrosting of refrigerators and freezers improves their operation as well as saves energy.

✓ Check refrigerator and freezer to see if rubber seal is tight all the way around.

✓ When cooking, learn to depend on timers and thermostats instead of opening the oven door or lifting lids on pots.

✓ Try to plan oven meals with foods that can all be cooked at the same time. This can save a considerable amount of energy.

✓ Install a clothes dryer heat diverter (electric dryers only) which allows heat from dryer to vent indoors rather than escaping outdoors in winter.

✓ Let dishes dry in a dishwasher with drying cycle off.

✓ Install a clothesline for use in the summer (and winter).

✓ Use pressure cookers and microwave ovens if you have them.

✓ Be sure that "hot" appliances are not next to "cold" appliances.

✓ Use electric or extra blankets instead of turning up the furnace at night.

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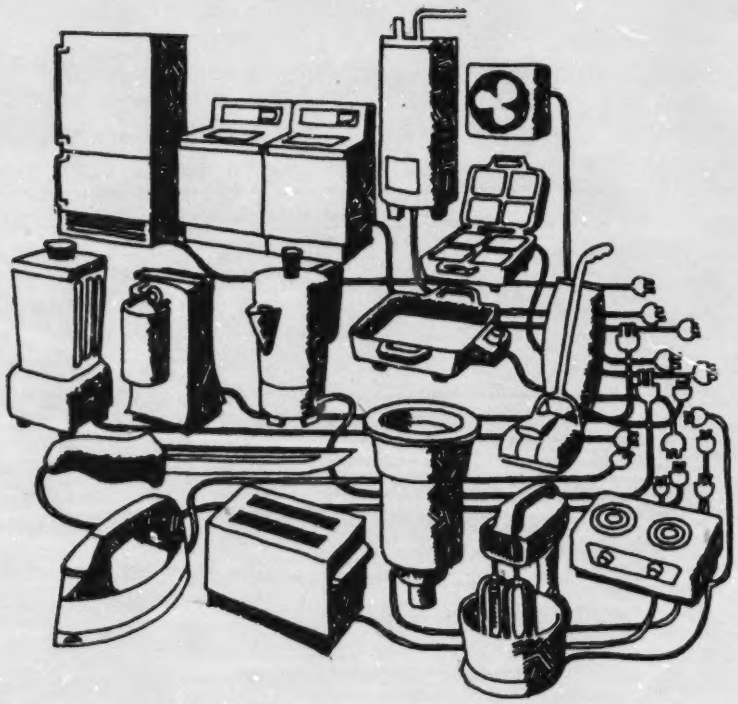

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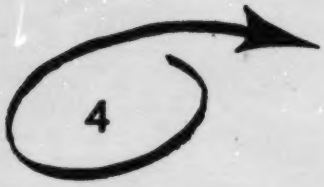
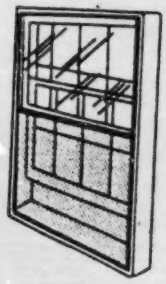
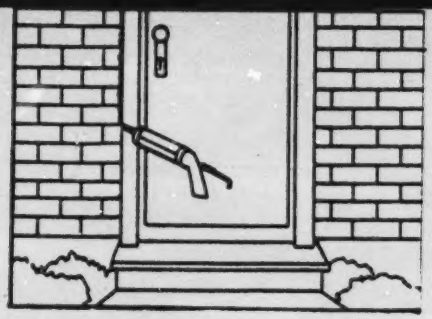


MAKING PRODUCT DECISIONS

GET THE MOST CONSERVATION VALUE FOR YOUR DOLLAR ON:

- CAULKING AND SEALANTS
- WEATHERSTRIPPING
- INSULATION
- STORM WINDOWS AND DOORS





SAVING ENERGY WITH CAULKING

WHERE TO CAULK

If you can feel drafts around windows, doors, electrical outlets or elsewhere in your home's structure, caulking and weatherstripping are probably needed. And it doesn't take an experienced handyman to do the work, you can do it yourself.

Caulking should be applied wherever two different materials or parts of the house meet. These areas include:

- Between tops of windows, doors and siding.
- At joints between window frames, sills and siding.
- At corners formed by siding.
- At sills where wood structure meets the foundation.
- Outside water faucets, electrical outlets or other special breaks in the outside house surface.
- Where pipes and wires penetrate the ceiling below an unheated attic.
- Between porches and main body of house.
- Where chimney or masonry meets siding.
- If you have a heated attic, where the wall meets the eave at the gable ends.

Note: Caulking should never be applied between surfaces that are to be moved, such as between window sashes and frames.

CAULKING MATERIALS

To apply caulking you will need a caulking gun, caulking cartridges, filler materials, a putty knife or large screwdriver and a ladder. The main types of caulking compounds available in cartridges are:

- <u>Oil or Resin Base</u>

  - Least expensive but least durable; should not be used on walls facing south or west
  - It bonds to most surfaces but a primer must be used if it is applied to a porous surface
  - Should not be applied if the temperature is below 60 degrees Fahrenheit

. Latex

- Requires a primer if applied to a metal surface
- May last up to 10 years if applied when the temperature is above 40 degrees
- A good choice for wood or painted surfaces

. Silicone

- Requires a primer if applied over a bonding agent or over a previously glued crack
- May last up to 20 years
- Can be applied in below-freezing temperatures
- Excellent for use on wood, metal and painted surfaces
- Should be used on any south- or west-facing wall

. Butyl

- Requires no primer
- Is fairly durable, should last up to 10 years
- Must be applied when the temperature is above 40 degrees Fahrenheit
- Good choice for unpainted wood, metal, and masonry surfaces

DO NOT USE LEAD-BASED CAULKING COMPOUNDS: THEY ARE POISONOUS.

Caulking compound also comes in rope form for application by hand. It can be unwound and forced into cracks with your fingers and is especially useful for extra long cracks.

Filler materials include oakum and caulking cotton which are used to fill extra wide cracks like those at sills where the house meets the foundation.

TO CAULK:

1. Thoroughly clean area to be caulked with a solvent and putty knife. Solvent for latex is water; other caulking compounds require mineral spirits or naphtha as a solvent.

2. Get rid of dirt, built-up paint, and cracked putty or old caulking compound. The area must be dry.

3. If cracks are deep or wide, fill them with filler material. As a rule, cracks measuring more than 1/2 inch wide or 1/2 inch deep should not be filled with caulk.

4. Cut the spout of the caulking gun at an angle and at a place that will give you the proper size bead for the job.

5. Hold the gun at a 45 degree angle and work from top to bottom. Make sure the bead covers both sides of the crack. Don't skimp.

6. Smooth out the compound, either by hand or with a putty knife.

SAVING ENERGY WITH WEATHERSTRIPPING

WHERE TO WEATHERSTRIP

There are some simple tests to determine if your windows and doors need weatherstripping. On a windy or cold day, check for air leaks by placing your wet hand, a smoking cigarette or a thin tissue paper near the cracks around doors and windows. Also, look around the edges of your doors and windows for light penetrating through the cracks. (Note: The "weep" holes near the bottom of storm windows may allow light to penetrate. These openings are for moisture drainage and should not be plugged.)

Window sash and doors should be weatherstripped on all sides and tops and bottoms. Don't overlook the meeting rail where the top and bottom sash of double-hung windows come together.

Entrance doors, attic doors and inside and outside basement doors should be weatherstripped. Any door between a heated and an unheated space should be weatherstripped.

MATERIALS

Weatherstripping may be purchased by the foot or in handy kits. Weatherstripping materials include:

- Thin spring metal strips. These are almost invisible when installed and extremely durable. They are cut to length with tin snips and tacked in place.

- Adhesive backed foam: This also is difficult to see when installed but does not last. It is most effective on doors but may be applied on window frames where there is no movement. On double-hung windows, this is only on the bottom and top rails. Other types of windows can use foam strips in many more places.

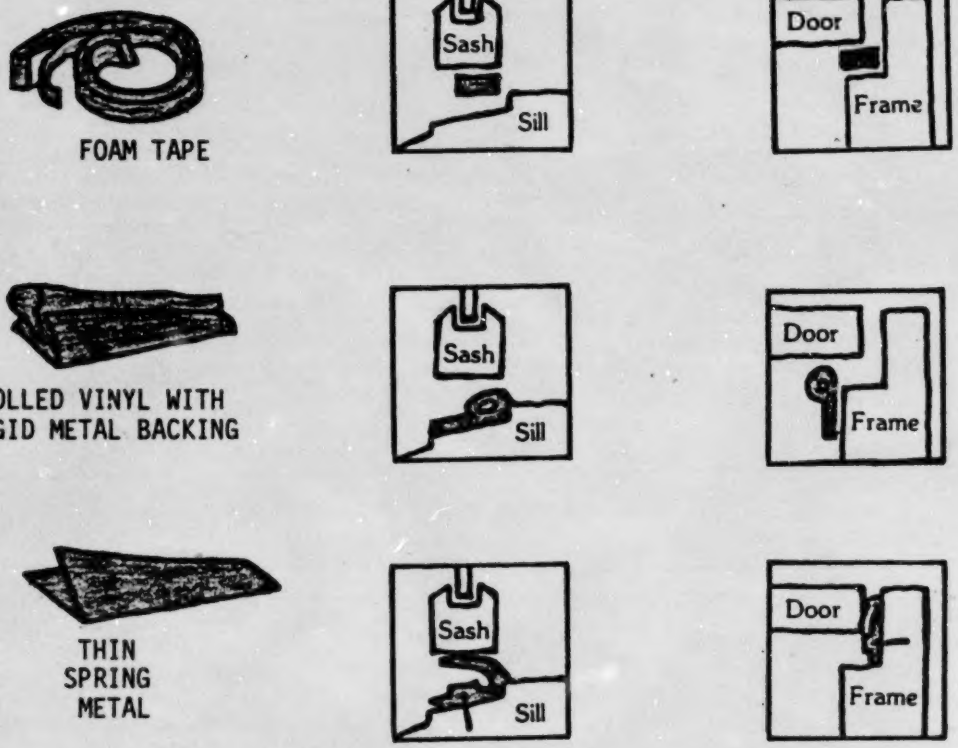
- Rolled vinyl with aluminum channel backing. This is easy to install, visible when installed and quite durable. It is cut to length with tin snips and nailed against door and window casings.

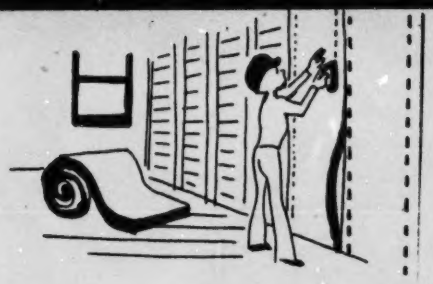
- Foam rubber with wood backing. It is nailed snugly against the door casing and is visible when installed. It is not very durable

. Rubber, neoprene or felt strips. They are nailed directly to the door above the threshold and can be installed without removing the door. Each is used to seal the bottoms of doors.

Consider replacing a badly worn threshold with a metal unit. Metal threshold units are available for doors of varying widths.

Other easily-installed types of weatherstripping include interlocking metal channels, door shoes and sweeps.





SAVING ENERGY WITH INSULATION

THE R-RATING

Insulation is measured in R-ratings. R is for resistance and the R-rating is a number that tells you how much resistance the insulation presents to heat flowing through it. The higher the R-rating the more resistance provided by the insulation and the easier the home is to heat or cool.

WHERE TO INSULATE

- Ceilings with cold spaces above.
- Exterior walls. The short walls of a split-level should not be neglected. Walls between living space and unheated garages or storage rooms should be insulated, too. Walls that are finished on both sides can be insulated only by aninsulation contractor.
- Floors above cold spaces--vented crawl spaces, garages, open porches, and any portion of a floor in a room that projects beyond the wall below.

Insulate attic living space:

- Between "collar beams" and sloping rafters. Be sure to leave an air space for ventilation between the insulation and roof deck.
- Between the studs of "knee walls".
- Between the joists of the floor outside the living space.
- Dormer walls and ceilings.

HOW MUCH DO YOU NEED?

If you have less than 6 inches of old insulation in your attic, it is wise to add more. Add a minimum of R-19.

In Colorado, a house with double-glass on the windows and ceilings insulated to R-30 is considered adequate. However, higher R-ratings in this climate zone may be justifiable because energy costs will continue to rise, and a high amount of attic-floor insulation will partially compensate for poorly insulated walls.

INSULATING MATERIALS

There are five basic types of insulation--batts, blankets, foamed-in-place, rigid board and loose-fill. The type of insulation used is less important than getting the proper R-rating.

Batts or blankets are usually made from glass fiber or mineral wool. They are commonly used for insulating attic floors, attic rafters, undersides of elevated floors, wood frame walls, crawl spaces, and basement walls. Batts or blankets are best suited for standard joist or rafter spacing of 16 or 24 inches, when the space between the joists is relatively free of obstructions. Batts and blankets come with or without a vapor barrier backing and they are fire and moisture resistant.

Foamed-in-place insulation is usually made of ureaformaldehyde. It can be used in hard-to-reach places, such as within existing wood frame walls and under attic flooring. Foamed-in-place insulation should be fire and moisture resistant. There have been problems with foam. You should check with local authorities.

Rigid board insulation is made from polystyrene or urethane plastic, or from glass fiber. It can be used as insulating sheathing between wall studs and the exterior surface of the home or to insulate basement walls. When used as an insulating sheathing, rigid board should be used in addition to other insulation within the walls.

Loose-fill insulation, either poured-in or blown-in, commonly is made of glass fiber, mineral wool, or cellulosic fiber. If you install cellulosic fiber insulation, check to see that the material meets federal specifications. When used in the ceiling or attic, loose-fill is easily applied and forms a complete, uniform cover of insulating material.

ASK AN EXPERT

Home insulation can, over the long run, save you money on your fuel costs - but it can also be expensive. It is important to obtain expert advice from a reputable dealer, contractor or your utility in evaluating your home's insulation needs. Once you have decided that the investment is worthwhile (it may not be worth the extra cost), think twice before you tackle the installation job yourself. Installing some forms of

insulation can be a tricky and sometimes risky task. It pays to get reliable, on-the-spot advice and- if the job is likely to be difficult and/or expensive - to get bids from several reputable contractors and a guarantee from the contractor you choose.

The R-Value Chart below gives an idea of how many inches of various insulating material are needed for different R-values. On the next page several important facts are listed for each insulation type. Use the list to help you choose the best insulation for your home.

R-Values Chart

	Batts or Blankets		Loose Fill (Poured In)		
	glass fiber	rock wool	glass fiber	rock wool	cellulosic fiber
R-11	3½"-4"	3"	5"	4"	3"
R-13	4"	4½"	6"	4½"	3½"
R-19	6"-6½"	5¼"	8"-9"	6"-7"	5"
R-22	6½"	6"	10"	7"-8"	6"
R-26	8"	8½"	12"	9"	7"-7½"
R-30	9½"-10½"	9"	13"-14"	10"-11"	8"
R-33	11"	10"	15"	11"-12"	9"
R-38	12"-13"	10½"	17"-18"	13"-14"	10"-11"

JUDGING INSULATION

Insulation, like many products, is made different ways for different purposes. Each has advantages and disadvantages. If you are considering using insulation, the following information can assist you in making a wise purchase.

Vermiculite: Comes in loose form like gravel and is excellent to fill in small places. It has an R-value of 2.0 per inch. It also absorbs moisture.

Fiberglass: Comes in loose fill, blankets and batts. It is inexpensive and fire resistant. The particles can irritate the skin. Its R-value is 3.3 per inch. It also gives off an odor when damp.

Rock Wool: Comes in loose fill, blankets and batts. It is inexpensive and fire resistant. Particles can irritate the skin. Its R-value is 3.3 per inch.

Polystyrene: Comes only in rigid board. It is extremely useful for below grade floors and exterior walls. It is highly combustible. Its R-value is 3.4. Although easily dented, it is moisture-resistant.

Cellulose: Comes in loose fill, blankets and batts. Can be installed through small holes. This material must be treated or it is inflammable. Its R-value is 3.7 per inch. This material, even when treated, may break down in a hot attic.

Urea Formaldehyde: It is a foam that hardens. Can be applied easily in exterior walls and is fire resistant. This material can leak through loose wall boards or other openings when installed. Caution: Fumes can be toxic. R-value is 4.5. Requires professional installation and can shrink some. THIS PRODUCT IS BANNED IN ARAPAHOE COUNTY AND ITS USE IS NOT RECOMMENDED ELSEWHERE.

Urethane: Is a foam that hardens. This product has the best insulation efficiency of those listed. Can leak through loose wall boards or other openings when installed. Its R-value is 5.3. Gives off noxious gas if ignited and requires professional installation. THIS PRODUCT IS NOT RECOMMENDED.

SAVING ENERGY WITH STORM WINDOWS AND DOORS

WHY INSTALL THEM?

Windows and doors can be big energy wasters. There are some three reasons.

1. Doors and windows that open have cracks around them.
2. Air can pass through the joints around window and door frames unless they are tightly sealed.
3. Glass itself is a highly heat conductive material. As well as allowing some heat out, however, windows let the sun shine in which passes heat into the home. On a sunny day, leave the curtains open and let the sun do your heating job for you. At night, however, cover the windows to keep the heat in.

PLASTIC STORM WINDOWS

Six-mill thick polyethelene plastic sheets can be attached easily over the outside or inside of your windows and they are inexpensive. They are almost as effective as, but far less durable than permanent type storm windows.

- To install these and reduce cold drafts, measure the width and length of your windows to determine the amount of plastic to buy. It can be purchased in rolls or kits.
- Cut and attach the plastic sheets to the inside or outside of the window frame so they will block the air that leaks around the movable parts of the window. If attached inside, masking type will do the job. If attached outside, use 1/4 inch by 1-1/4 inch wood slats as a frame and tack securely in place.
- As a rule, polyethelene plastic sheets will last only one year. Vinyl film is somewhat more costly and durable.

SINGLE PANE STORM WINDOWS

Single pane storm windows are less expensive than other types of storm windows, but they cannot be opened easily after installation

. To install them, decide how you want the windows to sit in the frame. Your measurements will be the outside measurements of the storm window. Be as accurate as possible, then allow 1/8 inch along each edge for clearance.

. When your windows are completed, check the actual measurements carefully against your original figures.

. Fix them in place with movable clips so they can be removed easily.

COMBINATION WINDOWS AND DOORS

Triple track combination storm windows are designed for installation over double hung windows. They are permanently installed and can be opened at any time with a sliding screen for ventilation. Double track combination units are also available at less cost.

Combination (window and screen) storm doors are designed for installation over exterior doors.

You can save from 10 to 15 percent of the purchase price by installing the windows and doors yourself. The tools you will need are: caulking and gun, drill, screwdriver, hammer, and weatherstripping.

If you order the storm doors and windows from a supplier, first measure all the places where you want them installed.

After the storm windows and doors are installed but before the supplier leaves, make sure that both the window sashes and screen sash move smoothly and seal tightly when closed after installation. Poor installation can cause misalignment. Be sure there is a tightly caulked seal around the edge of the storm windows.

The newly installed storm doors should operate smoothly and close tightly. Check for cracks around the jamb and make sure the seal is as air-tight as possible. Also, remove and replace the exchangeable panels (window and screen) to make sure they fit properly and with a weather-tight seal.

QUALITY HINTS

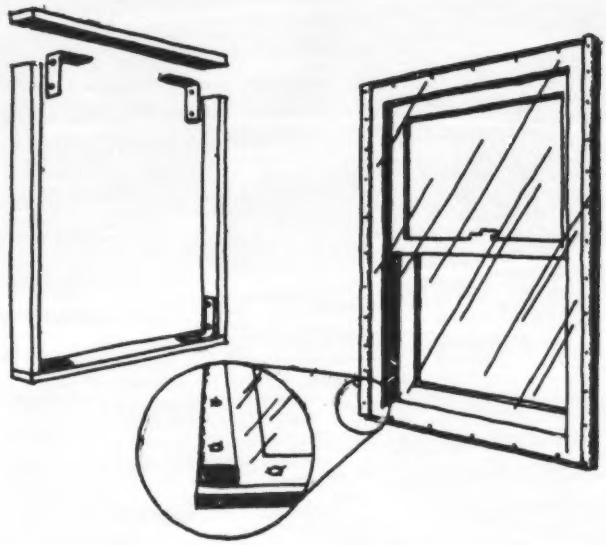
Frame finish. A mill finish (plain aluminum) will oxidize, reducing operating ease and degrading appearance. An anodized or baked enamel finish is better.

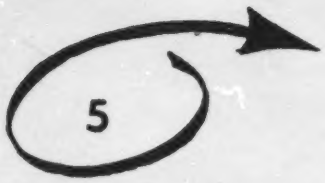
Corner joints. Good construction increases the strength and performance of storm windows and doors. Corners are a good place to check construction. They should be strong and air-tight. Normally, overlapped corner joints are better than mitered corners. If you can see through the joints, they will leak air.

Weatherstripping. Storm windows and doors are supposed to reduce air leakage. The depth of the metal grooves (sash tracks) at the sides of the windows and the general weatherstripping quality make a big difference in how well storm windows and doors can do their job. Compare several types before deciding.

Hardware. The quality of locks and catches has a direct effect on durability and is a good indicator of overall construction quality.

Construction material. Storm doors of wood and steel can also be purchased within the same price range as the aluminum variety. The choice is primarily up to individual taste.





HOW WELL ARE YOU DOING?

You should take the time to see how well your plan is working. Are you saving energy? Are you saving dollars?

To find out, compare your monthly usage of natural gas, electricity, heating oil or propane with the same month last year. Do not compare costs directly. Remember that they will continue to rise.

Do not give up if your total cost this year is greater than last year's. Perhaps this winter has been more severe than last. Even though your cost may be higher, think what you would have had to pay if you hadn't saved any energy!

Make it a family affair. Involve the entire family in saving energy. Make it a challenge for each member to reduce wasteful uses.

Remember: All of us can save energy and control the impact of increasing costs.

For further assistance call or write to:

Project HEAT
Arapahoe County
5334 S. Prince Street
Littleton, CO 80166
(303) 795-4995

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